FOREST PEST MANAGEMENT
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ROOT EXAMINATIONS OF JEFFREY PINES NEAR ROOT DISEASE CENTERS AT THE TALLAC HISTORIC SITE, LAKE TAHOE BASIN MANAGEMENT UNIT

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ABSTRACT

A sampling procedure to assess the stability of pines with suspected root decay (Phaeolus schwenitzii) was evaluated at a Lake Tahoe historic site. Structural roots were excavated and examined for decay. The procedure proved labor intensive and not practical to help predict failure potential. The presence of fruiting bodies (conks) near pines remains an important and convenient indicator of root decay.

BACKGROUND

Since 1989, nearly sixty trees have broken off or uprooted at the Tallac Historic Site, also referred to as the "estates" area. Almost all of the failures have been Jeffrey pines that were blown over by high southwesterly winds during winter or spring. The first two years of failures are described in Forest Pest Management Report No. C91-2, dated February 6, 1991. At that time annosus root disease, caused by Heterobasidion annosum, was suspected as contributing to the failures, but in November, 1992, conks of the velvet top fungus (Phaeolus schweinitzii) were found scattered within the area of failures. Subsequent evidence reaffirmed that the velvet top fungus was well established on many, but not all, of the windthrown trees. Soil moisture conditions (a high water table or saturated soils) and rooting depth of Jeffrey pines have contributed to more recent failures, most notably in the spring of 1996.

A meeting held in the winter of 1993 was attended by Basin personnel concerned about management and safety of the site. It was decided to first inventory all trees in the estates area, and then to try and develop a sampling procedure that might help identify unstable trees. The inventory was designed to collect above ground tree characteristics data that might reveal conditions indicating high failure potential. No obvious failure indicators have been identified

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from the survey, to date. This report summarizes examinations of Jeffrey pine structural roots suspected of having root decay due to the velvet top fungus.

ROOT EXAMINATIONS

The following personnel participated in examining roots during the week of August 5, 1996:

John Kliejunas, Plant Pathologist, FPM, Regional Office
John Pronos, Plant Pathologist, FPM, Sonora, CA
Garey Slaughter, Biological Technician, Univ. CA - Davis
Bill Woodruff, Plant Pathologist, FPM, Susanville, CA

Jeffrey pines chosen for sampling were either on the periphery of an opening created by past failures or had crown conditions that suggested root disease. The general procedure was to locate two lateral support roots on the south facing side of each tree, which is the direction opposite to most failures. Once located, each root was uncovered so that approximately the upper one-half of its circumference was visible. Starting from the base of the tree, the condition of the root cambium was checked at 18 inch intervals up to a maximum of 54 inches. (Most Jeffrey pines with root rot that have blown over had roots fail between 2 and 6 feet from the base of the tree.) In some cases it was not practical to excavate each root out to 54".

At each sampling point along the root, we first exposed the cambium with a wood chisel to determine if it was alive. Then 4 millimeter diameter wood core was removed using a standard forestry increment borer that had been surface sterilized with 95% methanol. Each core went through at least one-half of the root diameter.

Before sampling live trees, we first examined the roots on a Jeffrey pine stump that had been cut several years earlier. This tree, when still standing, had P. schweinitzii conks on the ground nearby and when sampled with an increment borer was found to have extensive heart rot. Because the tree was large and leaned toward the Baldwin Estate building, it was removed. On the stump surface, only a few inches of outer sound sapwood remained around a core of advanced brown cubical rot. Two lateral roots were exposed and each was sampled with an increment borer 18 inches from where the soil met the base of the tree. The first root sampled showed about one-half of the root diameter was occupied by decay while the second root core had no decay.

Live Trees Examined

TREE BA-82: 48" DBH, 125' tall, 25% live crown, with an obvious lean towards the northeast corner of the Baldwin Estate main building, which is also the Tallac Site Office and Visitor Center.

Root #1 - Sampled at 18" and 30", cambium healthy, no decay
Root #2 - Sampled at base of tree and 18", cambium healthy, no decay

COMMENTS: This tree is still of concern to us from a safety standpoint because of its lean and poor crown condition (dead lower branches). Although we did not find decay on the roots sampled, this is not a healthy tree, and should be closely watched.

TREE P-76: 32" DBH, 110′ tall, 40% live crown, leaning north toward Lake Tahoe, no target, poor vigor crown.

Root #1 - Sampled at 18", 36" and 54", cambium healthy, no decay
Root #2 - Sampled at 18" and twice at 36" (root forked between 18" and 36"), cambium healthy, no decay.

TREE P-71: 20" DBH, 100′ tall, 25% live crown, leans toward Lake Tahoe, no target, very narrow crown.

Root #1 - Sampled at 18", 36" and 54", cambium healthy, no decay
Root #2 - Sampled at 18" and 36", cambium healthy, no decay
Root #3 - Sampled at 36", cambium healthy, no decay

TREE P-12: 30" DBH, 130′ tall, 25% live crown, has a split upper bole, leans slightly towards 300 degrees, no target, numerous dead branches in the lower crown.

Root #1 - Sampled at 18", 36" and 52", cambium healthy, no decay, pocket of resin present in the 52" sample.
Root #2 - Sampled at 18", 36" and 54", cambium healthy, no decay

TREE V-74: 33" DBH, 100′ tall, 45% live crown, slight lean towards the southwest corner of Valhalla Lodge, live branches on only one side of tree.

Root #1 - Sampled at 18" and 36", cambium healthy, brown decay present in both samples; root diameter at the 18" sample point was 11", with 4" of sound wood and then decay; root diameter at the 36" sample point was 8", with 2" of sound wood and then decay. The entire lower portion of the root at 36" was dead and decayed.
Root #2 - Sampled at 18" and 36", cambium healthy, no decay

DISCUSSION/CONCLUSIONS

About 40 person-hours were spent excavating and sampling the 5 pines. Only one root out of 11 sampled had decay typical of P. schweinitzii, even though each tree was selected because its appearance or characteristics suggested root rot, or at least poor tree health. One of the two roots sampled from the stump showing extensive butt rot had decay present 18" from the base. We expected a much higher frequency of root wood decay. The following conclusions were made:

1. This procedure found very little root decay in the roots sampled. Unless some of these trees fail in the future, we will not know the true condition of the remaining roots. If the sampling is an accurate estimate of root system condition, then something else is causing the above ground portion of the tree to look unhealthy.

2. The excavation required to expose two lateral roots is moderately disruptive to the site because any ground cover and soil near the

roots need to be moved. This disruption is temporary and the site is readily restored to its original condition after root sampling is completed.

3. Sampling only two lateral roots on a tree may not give a true picture of the root system condition. We probably viewed far less than 10% of the number and length of roots on each tree.

4. An average of 8 person-hours was spent on each tree. The procedure is labor intensive, and the Lake Tahoe Basin Management Unit may not have the resources to devote this much time on every tree that may have root problems.

5. The two roots found with decay were from a tree and stump that previously had conks of P. schweinitzii nearby. This underscores the importance of conks as indicators of root decay and they should not be overlooked. In other words, if fruiting bodies are found, any pines within 10 to 15 feet should be closely evaluated.

6. We concluded that this sampling scheme does not provide the information needed to adequately assess root system condition and to make predictions on future tree failures.